

### REMARKS

Claims 1-12 are pending in the application and are at issue. The sole amendments are to claims 7 and 8 to insert commas clarifying these claims, and to claim 12 to correct an obvious typographical error in the pendency of the claim.

The present invention is directed to a process for reducing the residual monomer content and enhancing the wet strength of articles formed from a water-absorbent crosslinked polymer *foam*. The polymer foam contains units derived from monoethylenically unsaturated acids (e.g., acrylic acid). The process involves treating the article with a *polymer* containing primary or secondary amino groups, e.g., polyvinylamine, having a molecular mass of at least 300.

Claims 1-8 stand rejected under 35 U.S.C. §102(e) as being anticipated by Saija et al. U.S. Patent Publication 2004/0046151 ('151). Claims 9-12 stand rejected under 35 U.S.C. §103 as being obvious over the '151 publication. The examiner bases these rejections on treatment of paper using a functional siloxane and an initiator salt having an *ammonium ion* and the reduction of residual monomer using a redox pair including an *ammonium ion*, for example. It is submitted that these rejections are in error and should be withdrawn.

First, the '151 publication is directed to aqueous dispersions of polymers as opposed to foams. Also, and importantly, the '151 publication fails to teach or suggest any treatment with a polymer having primary and/or secondary amino groups. The '151 publication merely teaches using an *ammonium persulfate*

initiator. This ammonium ion ( $\text{NH}_4^+$ ) is substantially different from a polymer containing a primary and/or secondary amino group, i.e.,  $-\text{NH}_2$  or  $-\text{NHR}$ . The primary and secondary amino groups are covalently bound to the polymer, and are not monomeric like  $\text{NH}_4^+$ . Furthermore, the ammonium containing initiator is used prior to polymerization and does not function to reduce the residual monomer content after polymerization.

The examiner also points to a redox pair used after polymerization to reduce residual monomer content. Again, the '151 publication merely teaches using a redox pair that does not release formaldehyde, and possibly having an ammonium ion, e.g., ammonium hydrogen sulfite. Like the initiator discussed above, such a redox pair is different from a polymer having primary and/or secondary amino groups. Furthermore, the ammonium cation of the redox pair is inert, and does not act to reduce residual monomer content. The sulfite portion of the compound is the active agent. The '151 patent also absolutely fails to teach reducing residual monomer content, or improved the wet strength of a foam, let alone both, using an amino-group containing polymer.

Accordingly, because a difference exists between the present claims and the disclosure of the '151 publication, the cited publication cannot anticipate claims 1-8 under 35 U.S.C. §102(e). It also is submitted that the differences between the '151 publication and the present claims are nonobvious differences.

The '151 patent teachings are limited to disclosing a polymerization initiator and/or a redox pair possibly containing an ammonium ion. In each instance,

the ammonium ion is neither the active initiator nor the agent that reduces residual monomer, i.e., an alkali metal can be substituted for ammonium (see '151 publication, column 2, paragraph [0029]). In addition, the '151 publication absolutely fails to mention an amino-containing polymer for any use, let alone to increase wet strength and reduce residual monomer content of a foam. The '151 publication also is directed to aqueous dispersion of polymers rather than a polymeric foam, and it is the dispersed polymer that improves the wet strength of glass and textile fiber. In contrast, the present claims are directed to enhancing the wet strength of a polymeric foam with an amino-containing polymer.

Persons skilled in the art would not have been motivated from the '151 publication, which is directed to aqueous dispersions, to apply the teachings therein to polymer foams, then alter the '151 teachings and utilize an amino-containing polymer to reduce residual monomer content and increase wet strength. The differences between the disclosed ammonium ion and the claimed amino-containing polymer are so great as to features, such chemical identity and function, that a person skilled in the art would have had no incentive to substitute one for the other with any reasonable expectation of achieving a same end result.

In summary, for all the reasons set forth above, it is submitted that the '151 publication neither anticipates the present claims under 35 U.S.C. §102(e) nor renders the claims obvious under 35 U.S.C. §103, and that this rejection should be withdrawn.

Claims 1-8 stand rejected under 35 U.S.C. §102(b) as being anticipated by Peterson U.S. Patent No. 4,147,845 ('845). The examiner bases the rejection on a disclosure that residual monomer content of expandable thermoplastic beads is reduced using a water-soluble initiator that can have an ammonium cation. Applicants traverse this rejection.

The '845 patent disclosure is substantially different from the presently claimed invention, and, therefore, can neither anticipate the present nor render the present claims obvious. First, the '845 patent is directed to reducing the monomer content in expandable thermoplastic beads, such as polyvinylidene-acrylonitrile, polystyrene, or styrene-acrylonitrile beads. The present claims are directed to "foams containing units derived from monoethylenically unsaturated acids," as recited in claim 1. The '845 fails to teach or suggest (a) foams or (b) a polymer derived from monoethylenically unsaturated acids, e.g., acrylic acid.

The '845 patent teaches a reduction in residual monomer content by warming a slurry of the beads in water in the presence of a water-soluble initiator ('845 patent, column 2, lines 39-47). The water-soluble initiator can be an inorganic, free radical initiator, such as *ammonium* persulfate. As stated above, the ammonium component of this compound is *inert*. The '845 patent fails to even mention an amino-containing polymer, let alone use of an amino-containing polymer to reduce residual monomer of a polymer foam. Finally, the '845 patent merely teaches the reduction of residual monomer from thermoplastic beads. The '845 patent fails to

teach, or even remotely address, an enhancement of the wet strength of an article formed from a polymeric foam. Therefore, the '845 patent teaches no more than the ammonium ions of the '151 publication, and the present claims are neither anticipated by, nor rendered obvious over, the '845 patent for the same reasons that the present claims are patentable over the '151 publication.

In view of the differences between the '845 patent disclosure and the present claims, the '845 patent cannot anticipate claims 1-8 under 35 U.S.C. §102(b). In addition, the differences between the '845 patent and the present claims are so substantial that claims 1-8 would not have been obvious over the '845 patent, i.e., beads versus a foam, a difference in the identity of the polymer, use of an inert ammonium ion rather than an amino-containing polymer, and a failure to disclose enhancing the wet strength of a foam. Persons skilled in the art are simply would not have had any motivation or incentive to make the drastic changes required after reading the '845 patent to arrive at the present invention.

In summary, for the reasons set forth above, and for the reasons set forth above relating to the patentability of claims 1-8 over the '151 publication, it is submitted that claims also 1-8 are patentable over the '845 patent.

Claims 1-12 stand rejected under 35 U.S.C. §103(a) as being obvious over Bailey et al. U.S. Patent No. 4,766,173 ('173) in view of the '151 publication. The basis of the rejection is that the '173 patent discloses a method for reducing residual monomers from a water-insoluble polyacrylic acid (PAA) using cysteine or

lysine, and that the '151 publication teaches an increase in the wet strength of paper using a silane-containing polymer and an ammonium compound to reduce residual monomers. Applicants traverse this rejection.

The '173 patent is directed to reducing the residual monomer content in a water-insoluble PAA hydrogel using a *naturally occurring* amino acid, e.g., cysteine or lysine ('173 patent, column 1, lines 29-35). Importantly, the '173 patent clearly states that not all amino acids reduce residual monomer content, e.g., tyrosine is ineffective ('173 patent, column 2, lines 17 through column 3, line 12).

The teachings of the '173 patent, therefore, are quite limited in showing that two amino acids reduce residual monomers, but another amino acid (i.e., tyrosine) and a primary amine (i.e., ethanolamine), do not effectively reduce the amount residual monomer from PAA. Based on these limited teachings, a person skilled in the art would not have been motivated to substitute an amino-containing polymer, as claimed, for the lysine and cysteine that the '173 patent shows to reduce residual monomer content. A lack of incentive to make such a substitution with any reasonable expectation of reducing residual monomer content is further evidenced by the fact that not even all amino acids are capable of reducing residual monomer content from PAA.

Accordingly, because of the substantial differences in structure and properties between amino acids and amino-containing polymers, and because the '173 patent teaches that not all amino acids effectively reduce residual monomer content, persons skilled in the art would

not consider substituting a claimed amino-containing polymer for an amino acid disclosed in the '173 patent.

The '151 publication does not overcome the deficiencies of the '173 patent. As discussed above, the '151 publication is limited to teaching initiators and/or redox pairs having an inert ammonium cation. Not only is an ammonium ion unrelated to an amino-containing polymer, the ammonium ion is not even the active component of the initiator or redox pair, e.g., an alkali metal ion can be substituted for the ammonium ion with no loss of activity. The ammonium ion is merely a counterion to provide water solubility.

Furthermore, the '151 publication is not directed to enhancing the wet strength of a foam. The '151 publication is directed to a polymer applied to glass fibers or textiles to impart enhanced properties to the fibers. This is different from the present invention in which the polymeric foam has its properties enhanced. In addition, the silane monomers referred to by the examiner are different from the claimed monomers that make up the foam. The '151 publication uses the silane-based polymer to enhance the properties of fibers. In contrast, the present invention utilizes an amino-containing polymer to enhance the wet strength properties of a polymer foam.

For the above reasons, and for the reasons set forth above with respect to the patentability of the claims over the '151 patent, the present claims would not have been obvious over a combination of the '173 patent and '151 publication. Persons skilled in the art would have had no motivation to substitute an amino-containing

polymer for a limited number of efficacious amino acids of the '173 patent to reduce residual monomer content, and the '151 publication is so different from the '173 patent and the present claims that the '151 publication fails to add anything to the '173 patent. The differences between an ammonium ion, an amino acid, and an amino-containing polymer, as disclosed in the cited art and in the present claims, are so great that the substitutions and correlations suggested by the examiner simply would not reasonably be considered by persons skilled in the art.

Accordingly, it is submitted that claims 1-12 are patentable over a combination of the '173 patent and the '151 publication, and that the rejection under 35 U.S.C. §103 should be withdrawn.

In summary, it is submitted that the claims are now in proper form and scope for allowance. An early and favorable action on the merits is respectfully requested.

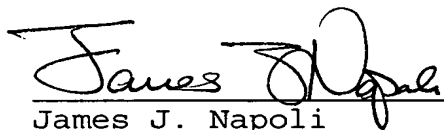
Should the examiner wish to discuss the foregoing, or any matter of form in an effort to advance this application toward allowance, the examiner is urged to telephone the undersigned at the indicated number.



Respectfully submitted,

**MARSHALL, GERSTEIN & BORUN LLP**

By

A handwritten signature in dark ink, appearing to read "James J. Napoli", is written over a horizontal line.

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